

REMARKS

At this time, Applicant has deleted all straight product claims, pursuing an amended process claim 12, new process claim 17 and product-by-process claim 1.

New claim 17 is directed to a method for preparing a deuterated alcohol having a condensed ring group composed of a norbornane ring and a C₅₋₇ hydrocarbon ring, in which at least one of the hydrogen atoms of the condensed ring group is a heavy hydrogen atom, by reacting the corresponding non-deuterated alcohol with heavy water in the presence of palladium catalyst under an atmosphere of light hydrogen gas. The deuterated alcohol is shown by formula [3] at page 8 of the application. The claimed method for producing the deuterated alcohol is described in the first full paragraph on page 10 of the application, plus Referential Examples No. 1 and No. 3 at pages 25 – 27 exemplify the process of new claim 17. Process claim 12 has been amended to include the method of claim 17 for preparing the deuterated alcohol that is reacted with the compound of the formula [2] for preparing the compound of the formula [1]. Thus, new claim 17 and the amendment to process claim 12 are supported as discussed immediately hereinabove. As noted, claim 1 has been amended to product-by-process format, depending upon claim 12, and thus also includes therein the process of claim 17. Entry of all amendments is respectfully requested.

Applicant recognizes that with the amendments herein, emphasis has been shifted away from the subject matter of the claims previously presented to a process feature disclosed in the present application related to the deuteration of a defined alcohol. The reason for this change in emphasis is the discovery by Applicant of CA 873873, submitted with an IDS filed concurrently

herewith, in which processes for producing adamantane-d16 and adamantanol-d15 therefrom are described. Adamantanol-d15 is within the scope of deuterated alcohol of the formula [3] set forth in the present application. However, as discussed hereinbelow, the method of claim 17, and thus also the method of amended claim 12 and claim 1 in product-by-process format, are patentably distinct from the disclosure of CA '873. The references previously of record do not relate to the now-claimed method invention; CA '873 is believed by Applicant to be the closest prior art.

In the present invention, an easily practiced, one-step method that is quick and efficient, and inexpensive, is claimed by which a deuterated condensed ring alcohol composed of a norbornane ring and a C₅₋₇ hydrocarbon ring is prepared. In contrast, the methods described in CA '873 are very disadvantageous in being multi-step processes and expensive. They also pose safety concerns and/or are inefficient in involving lengthy reaction time.

In CA '873, adamantanol-d15 is prepared from adamantane-d16 using a multi-step process. First, bromination of adamantane-d16 is carried out (page 11, lines 2 to 22 of CA '873 – all page and line references hereinbelow are to CA '873); followed by hydroxylation of the 1-bromo compound to produce adamantanol-d15 (page 12, line 23 to page 13, line 3).

The adamantane-d16 can be produced by one of two methods. First, the adamantane-d16 can be prepared by a two-step process of first deuterating tricyclodecane (Step A at page 5, line 17 to page 6, line 10) and then preparing adamantane-d16 therefrom (Step B at page 6, line 11 to line 28), or second, the adamantane-d16 can be prepared by H-D exchange between adamantane-d0 and n-dodecane d26 (page 10, lines 2 – 12). Thus, beginning with a precursor of

adamantane-d16, the processes of CA '873 for producing adamantanol-15 involve either 3 or 4 steps, some of which are very lengthy, and resulting in a reduced yield because of the use of a multi-step process in comparison with the one step method of Applicant's claims.

For example, the H-D exchange method suffers from a long reaction time (4 days), the use of an expensive solvent (n-dodecane) and so forth.

Furthermore, the precursor material tricycle [5.2.1.0.2,6] decane-d16 is prepared by (a) reacting corresponding tricyclodecane with deuterium gas in the presence of Pd/C at 250 degrees C for 195 hours (Step A at page 5, line 17 – page 6, line 10) or (b) reacting corresponding tricyclodecane with deuterium gas in the presence of Pd/C at 100 degrees C for 25 days (Step A at page 7, lines 2 – 9). These methods are disadvantageous in that the production cost increases because of employing expensive deuterium gas as the deuterium source, the reaction conditions are not safe because of the need to flow deuterium gas for a long time, the handling of tricyclodecane in the gas state is difficult and involves severe reaction conditions, and the processes are inefficient due to the long reaction times.

On the other hand, the process of the present invention involves an efficient single step for preparing a deuterated condensed ring alcohol. More specifically, in accordance with the present invention, a deuterated condensed ring alcohol is produced in which all or part of the light hydrogen atoms in the moiety attached to the alcoholic OH are replaced by heavy hydrogen atom(s) by carrying out the reaction of the corresponding light hydrogen compound with heavy water (D₂O) in the presence of palladium catalyst under an atmosphere of light hydrogen gas.

Heavy water is inexpensive and the reaction proceeds under mild conditions. Obviously, the method of the present invention is vastly superior to the multi-step processes of CA '873.

CA '873 does not teach or suggest the method of the present invention of producing a deuterated condensed ring alcohol in one step. The process of the present invention is without question unobvious from the teachings of CA '873. CA '873 could not possibly lead the skilled artisan to the presently claimed invention.

Applicant respectfully submits that upon review, the Examiner will conclude that a viable rejection of the instant claims cannot be based on CA '873, submitted with an IDS filed concurrently herewith. Early indication of allowability is respectfully requested.

With respect to the prior art rejections in the Final Office Action of January 7, 2008, as noted above, the references cited therein are not relevant to the now claimed method of deuteration invention. In this regard, in paragraphs 3 and 4 of the Office Action, claims 1 – 2, 4, and 6 – 16 are rejected under 35 U.S.C. 103(a) over Kawai et al in view of Koike and claims 1 – 16 are rejected under the same provision over Takase et al in view of Koike. Neither Kawai et al or Takase et al teach deuteration of their tricycle acrylates. Koike et al does not teach nor even mention any specific method for producing a substance MMA-d8. Accordingly, the rejections of record should be reconsidered and withdrawn.

In view of the above, reconsideration and allowance are now believed to be in order, and are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the listed telephone number.

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. Application No.: 10/565,535

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

/Brett S. Sylvester/

Brett S. Sylvester
Registration No. 32,765

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER

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